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SOME EXPERIENCES IN PRODUCTION OF SARIDELE

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Lacking of milk and milk products had ever been considered a crucial problem urgently needed to be solved in Indonesia. Because of the inadequate production of milk, the need for dietary protein especially in child and infant feeding programs became more critical.

In 1953, the production of cows' milk in Indonesia was about 20,000 litres per day. Projecting this figure for 1964, it was estimated to be about 50,000, so that in the country with 100 millions people, the average daily milk consumption per capita was about 0.5 ml. In order that every one could get 200 ml or a glass of cow's milk per day, the total milk production had to be 20,000,000 litres per day, 1,000 times milk production capacity in 1953. Milk and milk products obviously had to be imported in big quantities, and that costed a lot of foreign currency.

During that time considerable research on milk substitutes had been done by the Public Food Institute under the guidance of Prof. Dr. Poerwosoejarto who was later succeeded by Dr. Bradjat Prawiranegara. Further it was concluded that a substitute for milk should meet the following requirements:

1. It has to be made from raw materials continuously available in Indonesia.
2. The materials must be well recognized by most people, and its production capacity should be easily increased.
3. The flavour of the finished product must be acceptable.
4. The product should be stable at storage condition, and easily dissolved into solution for infant as well as child feeding; in other words it must have the characteristics of dried milk powder.
5. The product should be of high nutritive value, high in protein content, sufficient in fat, minerals and vitamins.
Soybean was then chosen as the main raw material, mainly because it is grown abundantly in the country, has a high protein content, and its protein is of high biological value. (3,4)

In 1953, representatives of the Unicef, the F.A.O. of the United Nations, the Ministry of Health of the Republic of Indonesia and State Bank for Industrial Development held discussion which resulted in an agreement to build a vegetable milk plant in Yogyakarta, Indonesia. Thus started the idea to prepare vegetable milk substitute: "SARIDELE".

The Unicef donated all the equipments necessary for the plant at a cost of about US $ 500,000. The F.A.O. supplied technical advices and provided fellowships and special training for the manager and two senior staff members abroad. Last but not least, the Government of the Republic of Indonesia together with the State Bank for Industrial Development provided the local facilities such as buildings, water supply, electricity and personnel. It was in the agreement, that the Ministry of Health would take 300 tons of Saridele powder yearly to be distributed freely/without charge to Mother and Child Health Centres, hospitals, clinics and schools.

In 1959, soy milk powders were produced and sold for the first time. The Saridele plant had been estimated to produce about 25 tons of the milk powder per month for the Ministry of Health. Then besides plain Saridele, flavoured soy milk products such as Toffaroma-Saridele, Banarcma-Saridele, Choco-Saridele, and Vanilla-Saridele were also produced for public market. The production was then increased to 40 tons of soy milk powders per month.

Because of having unfavourable economic situation, it was then impossible for the Government to buy that 300 tons yearly anymore. So the big problem aroused was how could the factory sell all the products in the public markets and make profit.
Finally it was decided in 1965, that instead of production of Saridale powder, the factory should produce S.G.M., a new kind of infant formula intended for breast milk substitute and based on mixture of skim milk powder, sugar and vegetable oils as the main components. This production has been very successful up till now and the production capacity is still increasing. Plant expansion has been just finished. Presently the factory also produces five other kinds of milk products besides SGM powder.

**Processing of Saridale**

According to Hand et. al (2), it was decided to use whole soybeans as the starting material (instead of a defatted product), since many areas in the world, including Indonesia, did not have enough facilities for expelling or extracting oil. The general outline of the process known as water extraction method and its flow-sheet were as follows:

1. The main raw material used for processing of soy milk was soybeans. By a vibrating screen, soybeans were thoroughly cleaned from sands, soils, and any other dirt. In that equipment, the beans were also selected according to its size.

2. After cleaning, soybeans were peeled and separated from the skins, soaked in soaking tanks for at least 4 hours until became soft. The clean soft soybeans were then cleaned in bean - cleaner and washer before ground in a desintegrator.

3. During grinding, certain amounts of hot water at 60°C as solvent, calcium oxides for making pH of the solution at about 6.8 - 7.0, and sesame were added.

4. The slurry was then collected in two protein extraction vessels (P.E.W.) to get the optimum extraction, and then filtered.
3. The addition of other vegetable oils would be reduced.

4. The number of batches would be reduced, and the operating time would be shorter.

5. Sanitation control would be easily carried out because of the elimination of filter-cakes / pulps.

6. Soaking process would be eliminated.

Problem encountered in Saridele production.

From the experiences obtained during the production of Saridele, some problems encountered in this production might be pointed out as follows:

1. Processing:
   a. Soybeans as the main raw material were obtained from various areas having different varieties. For this reason and according to Gyorgy (1), the PER values for Saridele showed in several assays fluctuations between 1.58 and 2.15.

Furthermore, there have been many kinds of protein-rich foods traditionally made from soybeans. These foods such as tahu (soybean curd), tempeh, and oncom, have been very well accepted especially for the low income groups.

Because of the production of Saridele, some considerable amount of soybeans used for making such traditionally made well accepted protein-rich foods might be reduced.

b. The pulp obtained from the filter should be handled in a proper sanitary condition. Filtering operation gave clogging problem very often.

c. The yield obtained by the water extraction method was still relatively low (45.3%) compared with that found by Hand et.al (65%) (2).

According to Kusumohadibroto (3), it was found that:
Percent losses total input .......................... 19.90

Percent actual yield total input ...................... 45.3

Percent actual yield theoretical yield ............ 69.4

d. Sesame was used to increased the fat content and sulfur-containing amino acids such as methionine. It was difficult to obtain sesame continuously in the markets.

e. The use of tin plate for packaging was considered expensive because it had to be imported. Another material available for packaging was only polyethylene. From experiments it was pointed out that the use of polyethylene with 0.12 mm thick would keep the quality of the product for only 3 or 4 months. The best packaging material was found to be a kind of laminate consisting of paper, foil and polyethylene.

2. Consumer acceptance.

a. Saridele was formerly a new kind of food, so that to introduce this product in the market, many problems of acceptability should be solved, such as food habits, prejudices, some psychological barriers, and organoleptic qualities.

b. To introduce such as new food beverage especially prepared for infants, some intensive clinical test and research should be done first. It took relatively long time and it was sensitive.

c. From the economical standpoint, the buying capacities of most people in Indonesia had been considered very low. It was difficult for the company to sell the products at reasonable price that most people could buy.


Marketing problem was closely related to the acceptability factor.
Considering from the above discussion on problem encountered in acceptability factors, many action programs on marketing should be carried out in order to reach the goal. Those were as follows:

a. educational approach and advertisement.
b. approach through various kinds of exhibition.
c. market trials.

It took relatively long time and it was expensive.

Saridele production in the future.

1. Considering that many efforts should be done to increase the protein intake per capita at various regions in Indonesia, that soybean protein is high in quality, that soybeans are abundantly produced in Indonesia, the production of such soy milk / Saridele in the future can be reconsidered.

2. Acceptability factor might be the most detrimental factor for the success of Saridele production in the future. Various kinds of beverages, dairy products, and other processed foods are now available in the public markets. The buying capacity of the consumer seems to be increasing. The knowledge of consumer on higher quality of foods seems to be increasing too. In other words it might be pointed out that the coming Saridele products in the future should be comparable with other similar foods in all aspects of quality especially related to the consumer acceptance.

3. The production of Saridele in the future should be done on commercial bases. Intensive preliminary feasibility study should be taken into consideration before the product can be successfully developed and marketed.

Summary.

From some previous experiences obtained in the production of soy milk / Saridele in Indonesia, it was pointed out that many pro-
Table III. Taste – panel comparison of Soy Milk samples (2).

<table>
<thead>
<tr>
<th>Fraction</th>
<th>Av. scores</th>
<th>Flavor</th>
<th>Consistency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dehulled whole soybeans</td>
<td>6.1</td>
<td></td>
<td>6.8</td>
</tr>
<tr>
<td>Dehulled soaked whole soybeans</td>
<td>5.2</td>
<td></td>
<td>5.6</td>
</tr>
<tr>
<td>Water extract soaked soybeans</td>
<td>6.7</td>
<td></td>
<td>5.1</td>
</tr>
<tr>
<td>Acid curd</td>
<td>1.8</td>
<td></td>
<td>1.8</td>
</tr>
</tbody>
</table>

*a The higher the score the better the flavor.

*b Absence of gritty particles. The higher the score the fewer the gritty particles.

Table IV. PER-values of four different preparations of soy milk (1).

<table>
<thead>
<tr>
<th></th>
<th>PER (after 4 weeks)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reference skim milk</td>
<td>2.63</td>
</tr>
<tr>
<td>Sobee</td>
<td>2.20</td>
</tr>
<tr>
<td>Mull-Soy</td>
<td>1.83</td>
</tr>
<tr>
<td>Soyalac</td>
<td>1.39</td>
</tr>
<tr>
<td>Saridele</td>
<td>1.80</td>
</tr>
</tbody>
</table>
### Table V.
**Final Six Months Inspection**

**High Temperature - High Humidity**

<table>
<thead>
<tr>
<th>Films Used</th>
<th>Toffa Saridele</th>
<th>Choco Saridele</th>
</tr>
</thead>
<tbody>
<tr>
<td>210-MST 44 Cello (0.001)</td>
<td>Moldy</td>
<td>Moldy</td>
</tr>
<tr>
<td>25# paper/30# poly (Continental csm)</td>
<td>Moldy</td>
<td>Moldy</td>
</tr>
<tr>
<td>1 1/2 mil poly (Visking)</td>
<td>Dark and stale</td>
<td>Dark, stale</td>
</tr>
<tr>
<td>140 K/30# med. des. poly (Dobackman)</td>
<td>Caked</td>
<td>Slight dark caked flavor 0.K.</td>
</tr>
<tr>
<td>Duplex cello</td>
<td>Slight dark caked flavor 0.K.</td>
<td>Darked; caked flavor 0.K.</td>
</tr>
<tr>
<td>(Milprint)</td>
<td>Moldy</td>
<td>Moldy</td>
</tr>
<tr>
<td>30# glassine</td>
<td>O.K.</td>
<td>O.K.</td>
</tr>
<tr>
<td>30# poly (Marathon)</td>
<td>O.K.</td>
<td>O.K.</td>
</tr>
<tr>
<td>30# paper/.00034 foil/30# poly (Continental csm)</td>
<td>O.K.</td>
<td>O.K.</td>
</tr>
</tbody>
</table>